

EVALUATING PLAYER IMMERSION IN
SURVIVAL HORROR VIDEO GAME DESIGN

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ABSTRACT

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While survival horror video games develop at a rapid pace, a gap in user experience research continues to widen alongside their development. More specifically, this study seeks to understand how perspective and narrative affect player immersion in survival horror video games by performing a comparative study of player experience during gameplay with and without virtual reality enhancement. By evaluating how players interact with the gameplay experience, this study will identify how differing player perspective provokes or affects player immersion. Based on these findings, this study recommends a less restrictive game structure that limits the use of narrative cutscenes, provides more than one way to complete game challenges/objectives, and allows for virtual reality enhancement options.

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CHAPTER 1: INTRODUCTION

Survival horror video games (SHVGs) are among the fastest-growing genre for independent video game developers. With horrific cinematic elements and fear-inducing characteristics, survival horror video games create a terrifying experience for users within a virtual environment. As with all video games, players expect the experience to be satisfying, challenging, and entertaining; but unlike most gaming genres, SHVGs must delicately design a narrative to terrify, challenge, and excite its players. To accomplish this trifecta, most SHVGs are constructed to make users feel “good” simply by surviving throughout the game. The balance of horror and entertainment within the virtual environment produces player immersion.

SHVGs are designed to limit the player’s control during gameplay. this lack of control, therefore, aims to promote fear and/or anxiety in the game’s players. Survival horror is specifically designed to constrict the player’s control, which is often referred to as player agency (Domsch, 2013). Survival horror limits player agency by restricting movement, reducing resources, and/or enclosing an area or location (Kirkland, 2009). These limitations are components of narrative or perspective SHVG design. While narrative components encompass the storyline and background information, perspective components encompass the ways in which narrative components are presented to the player. These components of perspective and narrative are used to increase the player’s vulnerability and provoke a player’s fear and anxiety.

Survival horror is a subset of the horror video game genre, but its more restrictive design structures cause it to be more distinct. Some video game researchers argue that SHVGs have no distinctive characteristics to separate the genre from horror games. To discredit this argument, video game author Brenna Hillier stated, “It’s an interesting distinction because the loss of agency in games with limited or no weapons is often much more scary than more empowering

titles. It's hard to be nervous when you've got an automatic shotgun, you know?" (2014).

Survival horror emphasizes the sensation of staying alive throughout the game, which sets it apart from other subgenres of horror. In this way, survival horror games foster player immersion by harnessing sensations of both horror and relief. Without a balance in sensation (fear and relief of fear), player immersion can either fall short, cause boredom, or become too intense, causing a player to withdraw from the game entirely due to fear and/or anxiety. SHVGs require further research to determine what components of video game design arouse the optimal balance of player fear and pleasure, thereby creating optimal player immersion.

Existing research of SHVG design is mainly focused on the use and effects of one design component within the genre. Researcher Ewan Kirkland's "Storytelling in Survival Horror Video Games" emphasizes the importance of storytelling by analyzing the relationship between narrative and narration within the SHVG genre. His research brings to light the use of cutscenes and their ability to harness experiences similar to that of horror cinema (Kirkland, 2009, p 66). Some research focuses on the way in which SHVG design manipulates sensory perception through elements like audio or graphics. In 2010, one group of researchers studied the ways in which players responded to characters of the video game. Results of this research showed that player fright was related to characters' human-like characteristics (Tinwell, Grimshaw, & Williams, 2010).

When both immersion and negative emotion work together, survival horror video games are capable of skewing a player's understanding of reality and fiction during play. This inability to distinguish reality from fiction can prevent players from feeling in control of the environment and/or their emotions. The restrictive nature of survival horror video games has led many indie

game developers to explore new approaches to harnessing player sensations in ways that enhance gameplay, player experience, and gamer immersion.

Immersion is regarded as the act of engaging the mind. This general definition, however, does not identify the complexity of player immersion in video games. This complexity stems from the different components of video game design that influence a players's sense of immersion. There are hundreds of components that have potential to promote or hinder immersion, though, most video game research focuses on a small set of components relative to the video game genre as a whole. For example, a study conducted by Daniel Kromand focused on survival horror video games' use of audio. His study suggests that sounds are a key component to provoking player immersion. Sound effects are distorted and adjusted to prevent players from distinguishing sounds of the fictional game environment from those of reality. This causes players to progressively become more immersed in the game (Kromand, 2008).

Rather than focus on a specific genre, some video game research focuses on a small set of components relative to the game's design structure, like the utilization platform-based gameplay or third person point-of-view. For example, video game scholar Gonzalo Frasca (2001) studied the ways in which the use of third-person perspective in video games, like *The Sims* (Maxis, 2000), promotes immersion differently than those of first-person perspective. His research argues that the relationship between players and characters contributes most to player immersion. This argument stems from the idea that players embody their characters through the act of performing as a character, which often leads to an emotional investment with the game and a fuller sense of immersion.

As technologies advance, research on player immersion continues to evolve and challenge existing theories. Several practices and methodologies have been created to study the

ways in which video game players become immersed within the gaming environment. Of the various video game genres, SHVGs provide complex results in video game player immersion due to the genre's restrictive design structure and fear-inducing narrative. Most commonly, these complexities are a result of narrative cutscenes, player agency, and player perspective.

Player perspective encompasses how both the point-of-view and visual components are communicated by the gaming environment. For example, survival horror video game *Resident Evil* (Capcom, 1996) is displayed in third-person perspective, showing the player's character throughout gameplay (Capcom, 1996), while *Slender: The Eight Pages* (Parsec Productions, 2012) is displayed in first-person perspective, showing the character's viewpoint throughout gameplay (Parsec Productions, 2012). In addition to player perspectives in the survival horror genre, player immersion is stimulated with technological enhancements like virtual reality (VR). VR is recognized as a three-dimensional, computer-simulated scenario that allows players to move, see, and experience the virtual gaming environment (Pimentel & Teixeira, 1993). VR alters spatial presence between the player and the game; this way, the player has the perspective of being within the virtual environment while remaining physically present in reality.

With technological advancements, video games continue to become more immersive interactive environments. Survival horror video games are no exception. Due to this rapid growth, video game design has surpassed academic user-experience (UX) research regarding players and interactive entertainment. According to computer science researcher Lennart E. Nacke (2010), this lack of understanding between players and gameplay shows a need for scientific methodologies for studying players in immersive entertainment. Although survival horror is rising in popularity within the video game development realm, user experience research has not clearly defined best practices for player immersion. Therefore, there is a need for more

research related to how components of both narrative and perspective affect player experience and overall immersion in SHVGs. Via a comparative study, this paper provides data that examines how user experience is affected by narrative and perspective within the video game environment, in turn giving future researchers and game designers data with which to construct a framework for more immersive survival horror games.

The experimental stimulus for this thesis is Red Barrels' 2017 video game *Outlast 2*, which represents all defining characteristics of the survival horror genre. Maintaining a restrictive game design, the protagonist's objective is to survive by means of hiding and running. In addition, *Outlast 2* is presented in a first-person perspective compatible with virtual reality enhancement, though budget and time constraints prevented *Outlast 2* from being developed specifically for virtual reality enhancement. Because of these constraints, the virtual reality enhancement does not provide a 360-degree perspective that a game developed for VR would exhibit. Instead, *Outlast 2* remains stagnant.

Much like its name suggests, *Outlast 2* is the sequel to *Outlast*, the first survival horror video game released by Red Barrels in 2013. The *Outlast* series is set in the perspective of an investigative journalist looking for answers to disturbing events. While investigating these events, the journalist finds himself in the midst of a sinister setting. The specific setting of *Outlast 2* is a dark town in the middle of the Arizona desert that is inhabited by murderous cult members. As one might imagine, the journalist is left to his own devices in order to survive—his only possessions being a camera, camera batteries, and bandages. Although the basic storyline does stream across the *Outlast* series, each game can be played non-chronologically. Therefore, players can enjoy and understand the storyline of each game without playing the series in order.

For these reasons, *Outlast 2* acts as the stimuli for this study, while player perspective acts as the independent variable.

This thesis aims to identify what components of survival horror video game design hinder or foster player responses and/or acts of immersion. This study implemented a mixed methods approach that includes user observation, semi-structured interviews, and three validated survey instruments intended to measure user immersion and/or presence to answer two research questions:

RQ1: What components of SHVG narrative design foster and/or hinder optimal player immersion?

RQ2: What components of SHVG perspective design foster and/or hinder optimal player immersion?

These research questions encompass two critical aspects of video game design: perspective and narrative. These aspects are of critical focus because they encompass what is being told to the player and how it is being told to the player. Therefore, data drawn from this focus shows the effect on player experience. This thesis presents a study that compares the influence of perspective and narrative to understand their effect on players' immersive tendencies. To address these research questions, this study outlined the following elements in subsequent chapters: comparative observations of how participants responded during gameplay, participants' self-assessments of immersive tendencies taken before and after gameplay, and participants' interview responses elaborating on their experience during gameplay. In addition, this data is also compared to player engagement with and without using virtual reality enhancement. This study examines two condition groups composed of 30 total participants. The first condition group consists of 19 participants and used virtual reality enhancement while playing *Outlast 2*. The second condition group of 11 participants did not use virtual reality enhancement while playing *Outlast 2*.

Participants filled out an immersive tendencies questionnaire developed by Witmer and Singer (1994) that focuses on their immersive tendencies during daily activities. Participants were then observed while playing 30 minutes of Red Barrels' *Outlast 2*. Following gameplay, participants completed another immersive tendencies questionnaire developed by Witmer and Singer (1994) that focused on their immersive tendencies during their *Outlast 2* gameplay experience. Finally, participants engaged in a semi-structured interview to elicit additional feedback about the gameplay experience. Questions centered on the immersive factors of the game, areas for improvement, and the player's emotional/physical state throughout the game. Data was then analyzed to determine key findings from all 30 participants' user experience. This allows for an understanding of how narrative and perspective affected gameplay. Then, the results of the two condition groups were compared. This comparison seeks to understand how a player's perspective affects player immersion in survival horror video games.

The remainder of this thesis is structured as follows: Chapter 2 provides a review of literature focused on additional research about immersion within video game environments, survival horror video game design, and immersion within the survival horror video game genre. Chapter 3 includes an outline of the research methods used by this thesis and an overview of procedures. Chapter 4 reports data derived from this mixed-methods approach. Finally, Chapter 5 offers a discussion of the research findings, including limitations and implications for future research.

CHAPTER 2: LITERATURE REVIEW

This chapter draws on literature from four related fields: video game immersion, survival horror video game design, sensory manipulation within survival horror video game design, and narrative manipulation within survival horror video game design.

Defining Immersion

The concept of immersion has been defined in a number of different ways depending upon its context. In the realm of video games, immersion is defined as either the process of becoming engaged in the gaming environment or the transference of psychological consciousness from reality to the gaming environment (Brockmyer et. al., 2007). In addition, immersion acts as a state of being present within the game (Wirth et al., 2007). Video game researchers study immersion to better understand player engagement, pleasure, and experience during gameplay. Brown and Cairns (2004) conducted a qualitative study that examined video game players' emotions, opinions, and behaviors regarding their favorite video games. The study led researchers to create a three-level process that categorizes each players' progression of immersion: (1) engagement, (2) engrossment, and (3) presence, or "total immersion."

Engagement is the first stage of immersion and requires the lowest amount of involvement and attention. Brown and Cairns (2006) claim that interest, time, and effort all contribute to a player's engagement. Once a player reaches the stage of engagement, attention and interest provoke the player to continue playing. With further game involvement, engagement transitions to *engrossment*, where the amount of energy, time, and attention invested into the game creates an emotional attachment to the narrative. The game begins to impact a gamer's

emotions.. In turn, the gamer is not as cognitively aware of their surroundings and self (Brown and Cairns, 2006).

Although immersion and presence are often used interchangeably, media research psychologists argue that total immersion is a game's ability to provoke the feeling of *presence* within the game environment (Wirth et al., 2007). This sense of presence is considered the third level of player immersion, i.e., total immersion (Brown and Cairns, 2006). This stage of presence, or "total immersion," is referenced as a state of mind rather than an act (Nacke, & Lindley, 2010). Once players reach the state of presence, they lack the ability to cognitively disengage or separate themselves from the virtual environment.

Researchers have various ways of studying the three levels player immersion. Game Experience Questionnaires (GEQs) are the most common form of research, as they allow researchers to understand what elements provoke immersion, emotion, or disinterest among game players. Immersion is typically regarded as the act of engaging the mind, but this general definition only skims video game researchers' area of focus. As time progresses and technologies advance, video game player immersion has become an ever-altering field of understanding. With countless practices and methodologies created to study the ways in which video game players become immersed within the gaming environment, survival horror remains one genre that research has overlooked.

Defining the Survival Horror Video Games Genre

Novitz (2017) notes in her research regarding survival horror that this genre of game briefly eases players' anxiety or terror after successfully surviving a challenge, whereas other

games reward players with accomplishments in mastering components of the system. In her article *Scarcity and Survival Horror* Novitz states,

“Rather than seeking to provide the player with a sense of power, success and affirmation that will encourage them to continue to reinvest their time and effort in the game, survival horror games make the player feel vulnerable and afraid, often by removing the sense of control and self-determination present in other forms of gameplay” (p. 70).

Survival horror video games, therefore, emphasize a player’s goal of survival. Unlike other categories of video games, the main goal of survival horror is to stay alive by maneuvering through horrific situations. Video game analyst Bernard Perron (2006) emphasizes the fact that the disadvantages bestowed upon the protagonist, such as “not so powerful weapons and limited ammo and health,” are main components to survival horror. In this way, the disadvantages increase the character’s vulnerability to overwhelming events in gameplay (Perron, 2006, p. 55).

Survival horror is designed to constrict a player’s control in the game via restrictions of movement, lack of resources, and/or an enclosed area or location (Kirkland, 2009). All of these elements increase a player’s vulnerability with the intent to provoke fear and anxiety. Survival horror emphasizes the player’s desire to stay alive throughout the game, which is what sets it apart from other subgenres of horror. Once the player completes a challenge, the player’s pleasure (or relief) overrides fear or anxiety; This pleasure provokes the player to continue playing the game.

In a video game, the fictional environment allows gamers to experience events without harsh consequences in reality. With little to no consequence, reality and the fictional environment are separated. Likewise, gamers cognitively processes the horrific elements with the understanding that they are fictional. As a result of their cognitive awareness, players are in control of both the experience and their emotional responses (Bantinaki, 2012). As game

developers continue to improve methods for immersing players in digital environments, survival horror video games are also designed to prompt negative emotions of fear and anxiety. This is done by manipulating narrative and sensory perception.

Sensory Perception Manipulation

Sensory perception manipulation emphasizes the sensational content that often creates emotional experiences. These techniques include, but are not limited to: sound, horrific visuals, and perspective. Perron (2012) tapped into specific survival horror games to understand how players engage with content and what aspects provoke further engagement. As an audio/visual form of media, Perron states that survival horror video games act as the perfect “breeding ground” for fear provocation by using eerie music or sound, perspective, and horrific visuals (2012, p. 15).

Abbasi and Jamak (2017) argue that a player’s consumption of a video game relates to the “hedonic” elements that lead to an immersive experience. In this case, “Hedonic” elements refer to a video game’s provocation of sensations. Video games provide “fun, feelings, and fantasies,” which create a personalized experience for the player. This “playful consumption” is what some scholars argue to be the addictive component in gaming. The positive sensations provoked by video games give players a desire to continue purchasing, playing, and immersing themselves within the experiences.

Sound: Music and Eerie Audio

Monforton (2016) argues that a video game’s ability to produce and harness the player’s emotion relies heavily on audio components within the game environment (p. 60). Likewise, according to Kromand (2008), survival horror’s use of overly-intensified audio suggests that

sounds are a key component to provoking fear. He argues that survival horror “purposely creates uncertainty” for the player by blurring their understanding of diegetic and nondiegetic sounds (page number). In this way, players are unable to clearly determine sounds of the fictional game environment from those of reality. Therefore, players progressively become more immersed in the game. An increase in player anxiety and uncertainty are also the results of the game’s sound design, which may or may not work within the game’s visual frame (Kromand, 2008, pg 16). An analysis of three survival horror games -- *BioShock*, *Silent Hill 2*, and *F.E.A.R.* -- led Kromand to conclude that the genre uses diegetic and nondiegetic sound to build tension or panic rather than to provide hints or cues for gamers.

During Kromand’s research of audio used in *Silent Hill 2* (Konami, 2001), the radio carried by the player character was a central point of study. With the foggy environment of *Silent Hill 2*, the radio acts as a tool to alert players to enemies that would otherwise go unnoticed. Kromand argues that the radio “has both too much and too little sensitivity to be a completely reliable warning system” (p. 18). This unreliability, therefore, distorts players’ ability to determine warning signals. Kromand continues,

“The soundscape in *Silent Hill 2* purposefully works against the player’s effort to read the affordances of aural warning cues. The game does supply them, but with an irregular set of consequences and therefore a broken causality. The soundscape of *Silent Hill 2* operates within a frame of uncertainty that constantly holds the player between knowledge and ignorance. Along with limited ammunition and field of vision, the soundscape efficiently builds a setting of horror” (p. 18).

Horrific Visuals

Kirkland also explores the “uncanny” elements of avatars, objects, and spaces used in survival horror video games. The term “uncanny” refers to Freud’s psychological theory that objects mixed with familiar and unfamiliar features can create uneasiness. The article argues that the “uncanny” aspects of survival horror video games are heavily seen in the relationship the player has with her avatar. The avatar is an embodiment of the player that is neither dead nor living (Kirkland, 2009). This avatar provides immersion within the game, though this immersion represents an uneasiness within the player by creating a human-machine combination (Kirkland, 2009).

Tinwell, Grimshaw, and Williams (2010) compared horror video games with Sigmund Freud’s theory of uncanniness by having participants rate video clips according to the frightening characteristics of video game characters. The characteristics analyzed were sounds matching up to lip movement, human-like voices, and human-like features. The results argued that participants found the least human-like characteristics provoked more fear than the more human-like characters.

Perspective

Perron (2009) argues that those playing survival horror video games seek thrills, thus the player is more inclined to immerse herself within gameplay by taking on the experience as a participant rather than a spectator. Mirror responses, where players mimic the responses of the avatar, are seen when players are fully immersed within gameplay. The fearful sensations cause the brain to react to the experience as if players are reacting for their own survival. These fearful sensations are caused by both natural and learned stimuli. Natural stimuli are occurrences where fear is provoked by primal instincts, while Learned stimuli are experiences based primarily from

the game. Because of these responses, Players are more likely to take on the role of a participant when the avatar's perspective is used.

“The gaze” refers to the perspective taken on by the gamers as she/he becomes immersed within the role given during gameplay. In Monforton's (2016) analysis of “the gaze,” the author studies how videogames redefine the differences and similarities of being watched and watching throughout gameplay. The paper recognizes players' avatars provoke an emotional response and intense immersion that allows “the gaze” to create emotional empathy or detachment. The study argues that the player's full immersion within the game allows for greater emotional sympathy when looking at “the gaze.”

First-person point-of-view (POV), which was first brought into video game environments during the early 1990s, was designed by using camera shots from the perspective of the character. It was a revolutionary design element that allowed players a new perspective of their characters. This perspective also allows the player to embody the character while developing a deeper emotional connection for the narrative (Tamborini & Skalski, 2006). Along with the camera shots mimicking eyesight of the character, video games have added character body parts within camera frames to provoke character embodiment. For example, Camera frames may include the avatar's hands holding weapons or performing the actions that the player controls (McMahan, 2003).

To advance first-person perspective in video gaming, designers have incorporated virtual reality (VR). Virtual reality is recognized as a three-dimensional computer-simulated scenario that allows players to move, see, and experience the virtual gaming environment (Pimentel & Teixeira, 1993). VR in a video game setting is produced with the addition of technological equipments, which includes a headset, sensors, or visual goggles. VR is able to enhance

sensational content found within the video game environment, which furthers player immersion (Calvert & Tan, 1994).

Narrative Manipulation

Survivor horror video games rely on a restrictive narrative structure to promote suspense while focusing on the story. The genre of game has a predetermined outcome, which does not allow for gamers to create or edit the game world. Ewan Kirkland (2009) notes in his essay *Storytelling in Survival Horror Video Games* that giving gamers the ability to revise the game compromises the game's control over the gamer. The narrative of a survival horror video game is restrictive to ensure the gamer's sense of helplessness.

Pinchbeck (2009) argues that greater immersion stems from the provoked feelings of restriction within the narrative. By accepting these restrictions during gameplay, players' lack of control breaks down the boundaries between the system and the players. Therefore, players fully take on the the first-person narrative and immerse themselves within the game. Monforton (2016) adds in her article *There Are No Observers Here* that survival horror video games allow players to interact with the rules of both the fictional and the real world. In this way, emotional responses are directly linked to the game's reliance of narrative and design. She states, "cognitive and emotional comprehension of a game world might provide vastly different understandings, but as a gestalt whole they provide meaning and context to affective emotions engendered by the game's complex systems" (2016, p. 55).

The amount of narrative restriction, however, is controversial among video game researchers. Evidence has shown that survival horror thrives from such restrictives narratives, while others argue the genre is most immersive with a less structured narrative. Christy and Fox

(2016) found that players identified more with their avatar during a first-person shooter game when a narrative was provided while participants that played the same first-person shooter were less immersed when they were given no narrative. This study suggests that a narrative, even a restrictive one, provides an emotional connection between the avatar and the player, but prevents the player from full immersion.

Narrative manipulation constructs the gameplay based on the player's physical, biological, or virtual response. Techniques of this kind include cutscenes, Artificial Intelligence (AI) affective response, biofeedback, and affective gaming. Researchers of the United Kingdom's Research in Interactive Drama Environments, Role Play, and Story-telling (RIDERS) network argue in multiple studies that gaming environments lack total immersion because gaming narratives are too structured. Interactive storytelling (IS) creates immersion when at least one of three techniques are used.

The first technique is the use of cut scenes, which are derived from cinema. Cutscenes are considered a passive video sequence that limits or restricts the player's ability to interact until the scene ends (Domsch, 2013). This technique separates the narrative's non-interactive components from gameplay actions (Aylett, Louchart, & Weallans, 2011). Rouse (2009) argues that the horror genre is best implemented when the narrative is vague so that players can use their imagination. In this way, players feel more immersed within the game. Rouse argues that strong narrative often restricts player freedom when these narratives use cutscenes, narration, and exposition during gameplay. These pauses in gameplay prevent players from totally immersing within the narrative. Therefore, Rouse suggests keeping these breaks in gameplay to a minimum if needed at all.

The second technique uses a controlled set of choices. These choices allow for a limited amount of freedom during gameplay by choosing the next action within the narrative structure (Aylett, Louchart & Weallans, 2011). The designer provides players with options during gameplay that allows some interactive freedom, though the narrative is still restrictively structured. Narratologists refer to this concept as “player agency” (Domsch, 2013, p. 35). The use of cutscenes in video game narratives take away player agency; rather than allow the player to have full control of their actions within the game, the player is usually prevented from interacting with the game. Instead, players are required to watch the scene much like cinema. Video game researcher Sebastian Domsch argues that cutscenes prevent player agency because the only choice provided to the player is whether to move forward or discontinue gameplay (2013).

Finally, the third technique is Artificial Intelligence (AI) based-content generation. With AI based content generation, the storyworld is able to expand from such compact representations. This integration allows a greater balance between narrative and user freedom during gameplay (Aylett, Louchart & Weallans, 2011). Zarzycki (2016) argues that virtual worlds would be more immersive by utilizing a combination of AI and a narrative feedback loop between the game system and player. By using these resources, virtual worlds and narratives could be generated to fit an individual’s desires during gameplay. The experience would then be more immersive and have a narrative uniquely designed for the player.

According to horror game researchers Vachiratamporn et al. (2014), affective gaming is “the form of gameplay where the player’s affective state is used to manipulate gameplay.” (p. 1). The development of affective games includes emotion recognition and affective adaptation. Affective feedback is defined as a relationship between the computer and the user where both

parties are affected by each other's actions. Allanson, Gilleade, and Dix (2005) suggest that when affective feedback is used properly in video games, gaming immersion is likely to enhance. Most video games have predetermined content generated throughout gameplay, which is predetermined by designers rather than based on player reactions during gameplay.

Vachiratamporn et al. (2014) studied affective feedback and survival horror games that used electrocardiograms (EKGs) and GEQs before and while players played *Slender Affect*. They asserted that enhanced immersion from affective feedback should be paired with predetermined scare tactics in the narrative. The balance would prevent players from foreseeing scary elements.

In 2005, Allanson, Gilleade, and Dix created a three-part heuristics evaluation for affective feedback that is intended to determine optimal gameplay for users. The evaluation tracks users' physiological effects from the game and then adjusts the game's content according to the results of the user's physiological effects. These three parts are "assist me," "challenge me," and "emote me." "Assist me" assesses the frustration of a user then adjusts the game as needed to de-stress the user, while "Challenge me" assesses the arousal of the player then adjusts the game to become more difficult for the user. "Emote me" assesses the player's emotional experience throughout the game and continuously generates content that causes new emotional experiences to arise (Allanson, Gilleade, & Dix, 2005).

There is little-to-no user-experience research that focuses on the ways in which narrative and perspective components of SHVG design promote player immersion. Rather, the majority of existing research focuses on analyzing one use and effects of one SHVG design component. This suggests that a gap in research prevents future SHVG developers from accessing a validated framework that provides its players the highest possible levels of immersion. Through a

comparative study, this thesis explores how components of perspective and narrative influence players' experience within the restrictive genre of survival horror.

CHAPTER 3: METHODOLOGY

This study used observational notes, two validated surveys, and semi-structured interviews to understand how participants responded to a 30-minute SHVG gameplay session. This thesis is intended to understand what narrative and perspective components of SHVGs hinder or promote player immersion. *Outlast 2* acts as the stimuli for this study, while player perspective acts as the independent variable. Two condition groups were employed to understand the ways in which players' response to gameplay was affected by virtual reality enhancement. The first condition group consisted of 19 participants and used virtual reality enhancement while playing *Outlast 2*. The second condition group of 11 participants did not use virtual reality enhancement while playing *Outlast 2*.

Two research questions were explored to determine what aspects of SHVG design impact player immersion. They are:

- **RQ1:** What components of SHVG narrative design foster and hinder optimal player immersion?
- **RQ2:** What components of SHVG perspective design foster and hinder optimal player immersion?

Observation notes, two validated surveys, and semi-structured interviews with 30 participants of two condition groups were used to understand what narrative and perspective components of *Outlast 2* caused the highest levels of immersion. The use of all three methods helped explore both research questions. The data compiled from all 30 participants were then compared by condition group to explore how virtual reality enhancement addressed both research questions.

This study used quantitative and qualitative methods to understand the elements of narrative and perception in survival horror video game design that promote the highest levels of

player immersion. Surveys, observational notes, and semi-structured interviews produced data that was then grouped by theme and analyzed. These results will be discussed in the following chapters.

Recruitment Procedure

Students at Ball State University were recruited via email through the BSU communication center. Participants were required to be 18 years of age or older, have prior experience using virtual reality enhancement, and have prior experience using the Playstation 4 console. The exclusion criteria included the following: no history of motion induced illness, no history of epilepsy, heart problems, high anxiety, high paranoia, psychosis, or hallucinations. Participants were notified of the risks involved with both *Outlast 2* and virtual reality enhancement.

Participants

All participants were pre-screened prior to the experiment to determine that the participants were 18 years of age or older, had interest in horror video games, and had no health problems that would pose a risk including a fear of viewing violence, flashing lights, or frightening graphics/sounds.

Thirty participants (22 male, 8 female) signed on to participate in a comparative study of player immersion in *Outlast 2* with or without using virtual reality (VR) enhancement. They were then randomly assigned to one of two conditions: *virtual reality* or *no virtual reality*. Nineteen participants were assigned to condition one. Eleven participants were assigned to condition two. Due to scheduling conflicts and participant absences, the conditions show an uneven split. Participants personally identified experience using the PlayStation 4 console and its equipment. In addition, participants self-identified their interest in horror video games and as

having no history of seizures, hallucinations, psychosis, or other health factors that horror video games could potentially provoke or worsen. Participants self-identified as having no hearing or eyesight impairments that would interfere with the experience of using virtual reality headset equipment, Playstation 4 equipment, or television equipment.

Due to the potential risks and discomforts of using virtual reality and playing *Outlast 2*, participants were advised to discontinue gameplay if at any point they felt too anxious, nauseous, or dizzy. Participants were also allotted a break from gameplay as well as water. Participants were able to discontinue the gameplay session or return to gameplay after the break. If needed, the observer had access to the Ball State Health Center, an emergency phone number, and additional assistance. The researcher only observed each participant while they played *Outlast 2*.

Stimuli: *Outlast 2*

Outlast 2 is a survival horror video game developed in 2017 by Red Barrels. The video game is in first-person perspective and rated “M for mature” due to its graphic content. *Outlast 2* was released on the following platforms: PlayStation 4, Nintendo Switch, Xbox One, Microsoft Windows, and Macintosh operating systems. With this in consideration, *Outlast 2* is one of the most widely accessible video games released by an independent game developer. This accessibility has potentially led to the *Outlast 2* being one of the most popular survival horror game in its genre. *Outlast 2* is compatible with virtual reality enhancement but was not developed for virtual reality enhancement; therefore, the virtual reality enhancement does not provide a 360-degree perspective that a game developed for VR would exhibit. Rather, the game display is fixed on one area of the headset much like a television screen.

Apparatus 1: PlayStation 4

According to *Business Insider* magazine, Playstation 4 (PS4) is one most widely used console around the world (Gilbert, 2017). In 2017, PS4 sold approximately 60 million consoles across the globe, with Nintendo taking lead. Due to its wide audience range and popularity, PS4 is used as this study's console for user-testing. In addition, PS4 is VR compatible, meaning that some video games can be played using virtual reality enhancement.

Apparatus 2: Playstation VR

Outlast 2 was played using the PlayStation VR (PSVR) headset. The PSVR headset includes a 1080p OLED display and is tethered to the PlayStation 4 console. Although PSVR headsets have the ability to use Sony Move wand controllers, the Dualshock 4 controller was used while playing *Outlast 2* due to compatibility issues. In addition, the PSVR headset includes two earbuds for audio isolation.

Instruments and procedure

Data was collected using a mixed methods approach that included the following instruments: background demographics questionnaire, a pre-gameplay Immersive Tendencies Questionnaire (Witmer & Singer, 1994), a post-gameplay Immersive Tendencies Questionnaire (Witmer & Singer, 1994), observational notes during gameplay, and a semi-structured interview post-gameplay.

Upon arrival, each participant completed the background demographics questionnaire that solicited personal data from each player including age, gender, average amount of hours playing video games per week, and favorite video game genres. After finishing the background demographics questionnaire, participants completed the Immersive Tendencies Questionnaire

(ITQ), which examines participants' tendency to experience immersion through various activities (Witmer & Singer, 1994). The questionnaire serves as a basis of understanding a participant's likelihood to immerse with various activities like reading or watching a television show. This set of data is gathered before participants played *Outlast 2*; therefore, it is considered pre-play ITQ data. Next, the researcher explained to the participants that they would play the survival horror video game *Outlast 2*. Participants were told they had 30 minutes to play *Outlast 2*. If the participant was assigned to condition one, the participant was seated at the Playstation 4 console, given a virtual reality headset, and instructed to wear it. Participants assigned to condition two were seated at the Playstation 4 without virtual reality enhancements. As participants played *Outlast 2*, they were observed by the researcher. The observer was present during all 30 participants' gameplay of *Outlast 2*. The observer was present to not only ensure participants' safety but also take observational notes throughout their interaction with the game. The focus of the notes concentrated on the player's physical state, physical and verbal reactions, verbal comments/questions, and use of PS4 equipment (Dualshock controller, PSVR, etc.). In addition, the notes included if and when participants quit playing voluntarily due to their physical or emotional state. These observations are addressed according to the two control groups--players using virtual reality and players not using virtual reality--and overarching notes. These notes were then recorded in Google Sheets. After gameplay, participants completed the Immersive Tendencies Questionnaire (ITQ), which examines a participant's perception of immersion while playing *Outlast 2*. The questionnaire serves as mechanism for understanding a participant's perspective relative to game's immersive characteristics. This set of data was gathered after the participant played *Outlast 2*; therefore, it is considered post-play ITQ data. Finally, participants completed a semi-structured interview (see Appendix D) conducted by the

researcher. The interview drew from the post-play ITQ to elicit elaboration upon the experience from each player. The questions were designed to pinpoint specific instances and examples during gameplay that either hindered or harnessed immersion, emotion, and responses.

Data Analysis

Results from the ITQ were entered in Google Sheets to calculate scoring based on the methods of Witmer and Singer (1994). These score calculations created totals for the four dimensions of immersion: focus, involvement, entertainment, and emotion. These calculations were then logged into SPSS software for statistical analysis. Semi-structured interviews were coded and grouped according to the key themes that emerged. The questions included in the interview (see Appendix D) include immersive elements of the game, physical and emotional feelings throughout gameplay, and major drawbacks of the experience that affected immersion. This coding schema focused on the participant's experience during their gameplay session of *Outlast 2*. A complete coding schema with the percentage of participants who made statements referring to the specific code was created. Observational notes focused on participants' movements, physical and verbal communication, and actions throughout their gameplay session.

Feedback Gathered During Semi-Structured Interview	Percentage of Responses (out of 30 Participants)
Q1. Describe how you felt for the majority of the experience.	
1. Confused	17%
2. Sick/Ill	10%
3. Tense	47%
4. Alert	33%
5. Frustrated/ Angry	13%

6.Scared	17%
7.Bored	3%
8.Anxious	27%
9.Other	17%
Q2. What elements of the experience contributed to that feeling?	
1.Sound	50%
2. Tutorial	10%
3. Storyline	10%
4. Character	3%
5. Challenges/Objectives	30%
6.Perspective	47%
7.Graphics	23%
8.PS4 equipment	17%
9.Other	3%
Q3. Were there elements of the video game that pulled you out of the experience? If so, what were those elements?	
1.Sound	0%
2. Tutorial	13%
3. Storyline	20%
4. Character	17%
5. Challenges/Objectives	33%
6.Perspective	13%
7.Graphics	6%
8.PS4 equipment	20%
9.Other	13%
Q4. What aspects of the experience made it seem real?	
1.Sound	47%
2. Tutorial	0%
3. Storyline	6%
4. Character	6%
5. Challenges/Objectives	10%
6.Perspective	50%
7.Graphics	47%

8.PS4 equipment	3%
9.Other	37%
Q5. What aspects of the experience could be improved so that it feels more immersive?	
1.Sound	6%
2. Tutorial	20%
3. Storyline	30%
4. Character	0%
5. Challenges/Objectives	20%
6.Perspective	40%
7.Graphics	3%
8.PS4 equipment	17%
9.Other	37%

Table 1. A coding schema of the interview answers including the percentage of participant responses.

CHAPTER 4: RESULTS

Results of this study were gathered from three methods: player observation, an Immersive Tendencies Questionnaire (ITQ) filled out by participants before and after gameplay, and interviews with participants after playing *Outlast 2*. The sections that follow detail results from 30 participants who engaged in these activities.

Player Observations

Of the 19 players using virtual reality during gameplay, seven participants had difficulty adjusting the virtual reality headset to fit their head and/or eyesight. This adjustment difficulty caused all seven players to pause the game in order to re-adjust the headset at least once during their 30 minute gameplay session. Two of the seven players communicated their confusion or frustration as they adjusted their headset. One participant said, “Maybe I should have taken off my glasses before starting the game. Or maybe I’m not smart enough to figure out how to keep this (gameplay visuals) from getting so blurry” [P20]. The headset also caused some users to struggle to see the Dualshock controller during gameplay. This was problematic for four of the nineteen players. Much like adjusting the headset, the four players paused the game at least once during their 30 minute gameplay session to lift off the headset and study the controller’s buttons.

A majority of non-VR participants demonstrated difficulty seeing the virtual world due to lighting. Four of the eleven non-VR participants physically moved the television screen at an angle to deflect light glares of the study environment. Three participants changed the brightness settings within the game’s start-up menu. One participant cupped her hand in order to diminish the environment’s brightness. While all eleven non-VR participants sat during gameplay, seventeen of the nineteen virtual reality participants opted to stand while playing the game.

Seventeen of the nineteen participants moved approximately two feet from the original space they began gameplay. This movement occurred from player reactions during more intense scenes in the video game. When comparing physical reactions between VR players and non-VR players, the majority of VR players displayed more physical reaction. These reactions include pacing, ducking, jumping, and turning. For example, P12 cowered with one arm covering her head as her character was killed by Marta, the first antagonist of *Outlast 2*.

In addition to physical movement, verbal communication also demonstrated VR participants' reactions to gameplay. Fourteen of the nineteen participants verbally communicated their feelings and thoughts while playing the game. One participant said while laughing, "I know I'm talking a lot but I tend to do that when I'm scared. I think it helps but I hope it's not annoying" [P14]. In contrast to these results, the majority of non-virtual reality game players were silent for the entirety of their 30-minute session. During the few occurrences of verbal communication, participants were reading tutorials or game objectives aloud. Four participants of the study discontinued their game session before their 30-minute session was complete. All four participants were using virtual reality. Using an iPhone timer at its loudest ringer setting, a thirty minute timer rang to notify the observer and gamer of the session's end. All non-VR players ended their session promptly after the alarm, whereas the majority of VR participants did not hear the initial timer. Once the observer turned on the study environment's lights, participants ended their session promptly.

Immersive Tendencies Questionnaire

Prior to playing the game *Outlast 2*, participants completed the Immersive Tendencies Questionnaire (ITQ), which asked them to rate their immersive tendencies during everyday activities such as watching television, having a conversation, or reading. After playing *Outlast 2*, they were again asked to complete an ITQ to gauge their immersive tendencies during gameplay. Paired-samples t-tests were conducted on pre- and post-gameplay results to compare how participants responded to questions focused on four dimensions of immersion: focus, involvement, entertainment, and emotion.

Regarding focus, there was a statistically significant difference in pre-play scores ($M=27.1$ $SD=4.1$) and post-play scores ($M=28.4$, $SD=5.2$); $t(29)=-2.1$, $p=.046$. There was also a statistically significant difference in entertainment pre-play scores ($M=13.3$ $SD=2.8$) and entertainment post-play scores ($M=14.8$, $SD=2.6$); $t(29)=-2.6$, $p=.032$. However, there was no statistical significance in differences between pre-play scores for involvement ($M=23.4$; $SD=5.7$) and emotion ($M=20.3$; $SD=4.7$) and post-play scores for involvement ($M=23.7$; $SD=6.1$); $t(29)=-0.3$, $p=.771$. and emotion ($M=20.4$; $SD=5.0$); $t(29)=-0.1$, $p=.930$.

Additionally, participants were divided into two conditions, with one group playing the game using a virtual reality headset and the other group playing the game in standard mode, which does not involve VR. Paired samples t-tests were run to compare pre- and post-play results between VR and non-VR players.

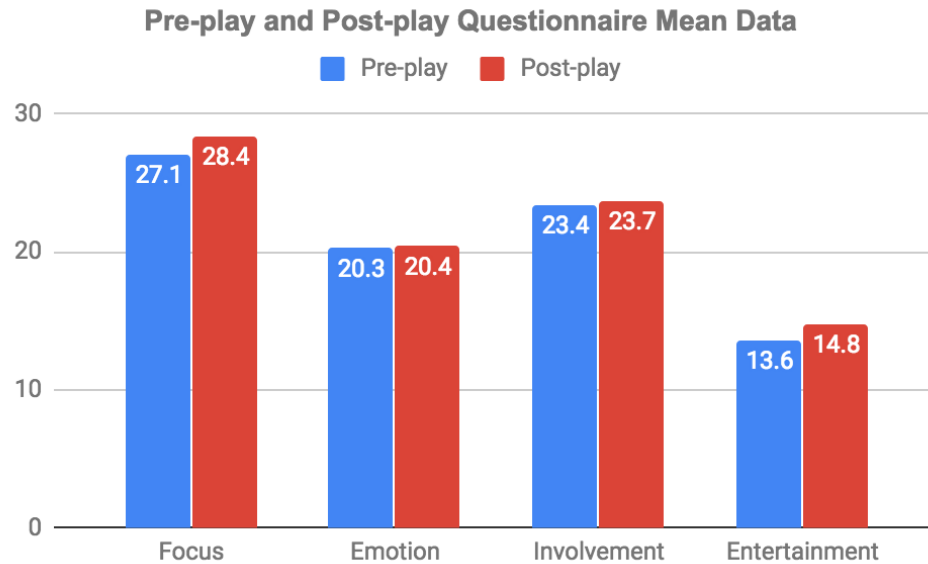


Figure 1. Data gathered from all 30 participants shows an increase in all four immersive dimensions when comparing pre-play mean scores to post-play mean scores.

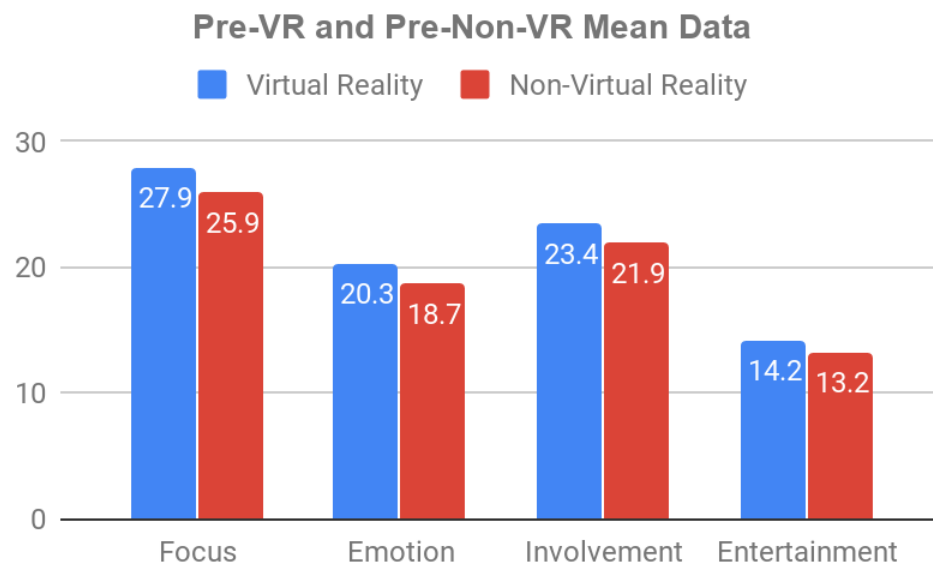


Figure 2. Although the data gathered was not statistically significant, results show higher scores in all four immersive dimensions when comparing VR gameplay scores to scores of non-VR gameplay.

There were no statistically significant differences between VR and non-VR players on any dimension except focus. For that dimension, statistical significance was found for post-play

scores only, with post-play VR scores ($M=30.8$; $SD=3.7$) and post-play non-VR scores ($M=25.6$; $SD=5.3$). $t(10)=-2.8$, $p = .019$.

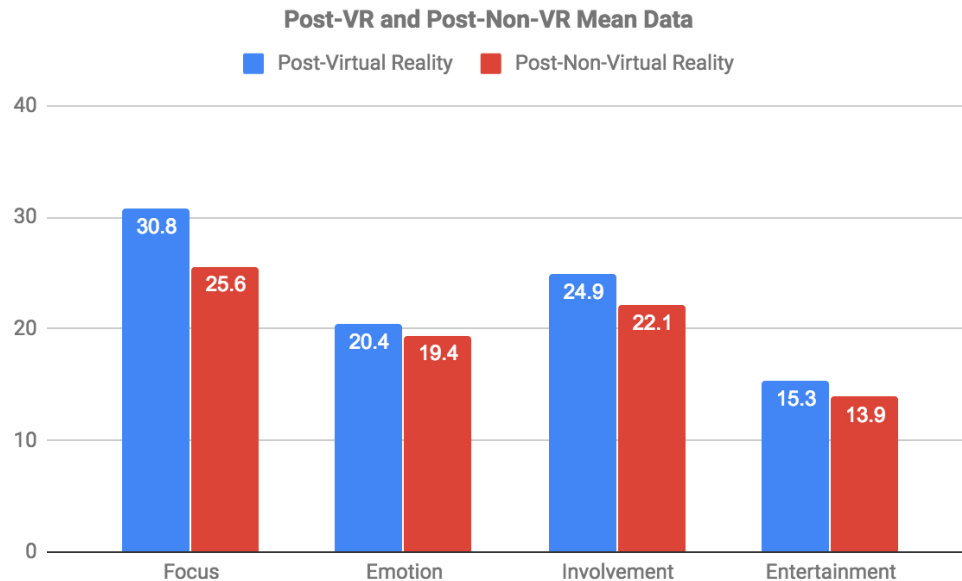


Figure 3. *Focus shows the highest level of statistical significance when comparing VR gameplay scores to scores of non-VR gameplay.*

Semi-structured Interviews

After playing the game *Outlast 2*, participants completed a semi-structured interview, which asked them a series of questions regarding their experience playing *Outlast 2*. Each interview was comprised of five questions and lasted approximately 10 minutes. Results of the semi-structured interviews generated approximately 45 units of analysis. Table 1 provides the interview questions and coding schema highlighting how players' experience was affected by game design. This table offers the most common themes that emerged by players recalling their experience of playing *Outlast 2*. The following results are comprised of the three elements that generated the highest responses: sound, perspective, and challenges/objectives.

Sound was recognized as the most immersive element of *Outlast 2*. At the start of each interview, participants were asked how they felt for the majority of their gameplay experience.

While there were nine common answers for this initial question, tension, alertness, and anxiety comprised the majority of responses. 47% of participants answered “tense,” 30% of participants answered “alert,” and 27% of participants answered “anxious.”

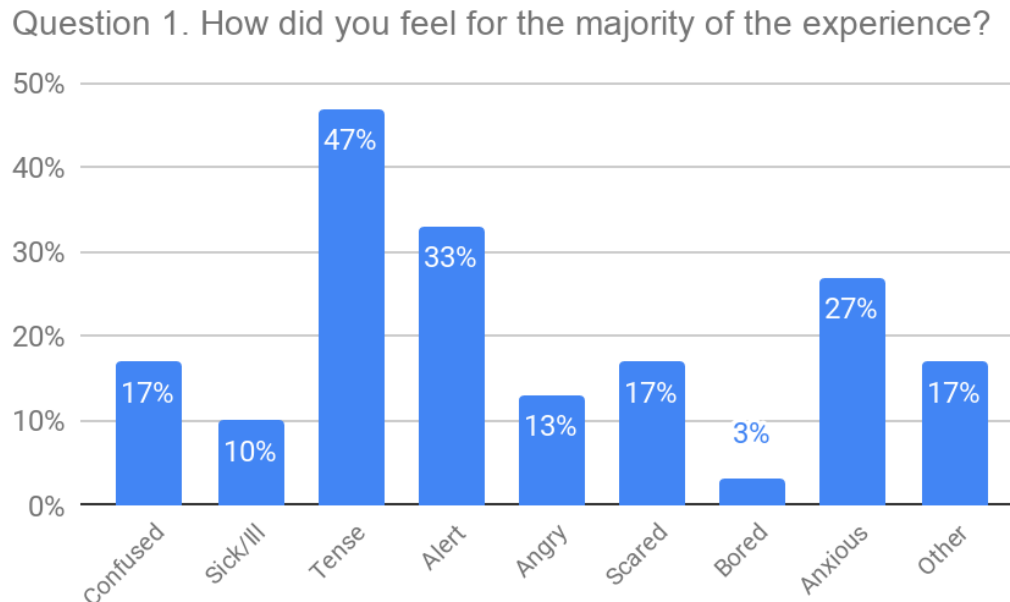


Figure 4. Data shows the highest response percentages are feelings of tension, alertness, and anxiety during player gameplay.

One participant said, “I feel more alert after playing, like my adrenaline was definitely used. So, I think I’ll be more awake for my night class after this” [P11]. Of these answers, half of participants reported that sound was one of the leading factors in causing these feelings. This answer occurred more often than all other elements. Again, data shows 50% of participants said that sound was responsible for making their experience seem real. Both condition groups showed similar responses to sound’s effect on their gameplay experience. One virtual reality participant said, “VR is a novelty item that seems too gimmicky at this stage. I honestly think a good set of headphones create the same level of immersion” [P4].

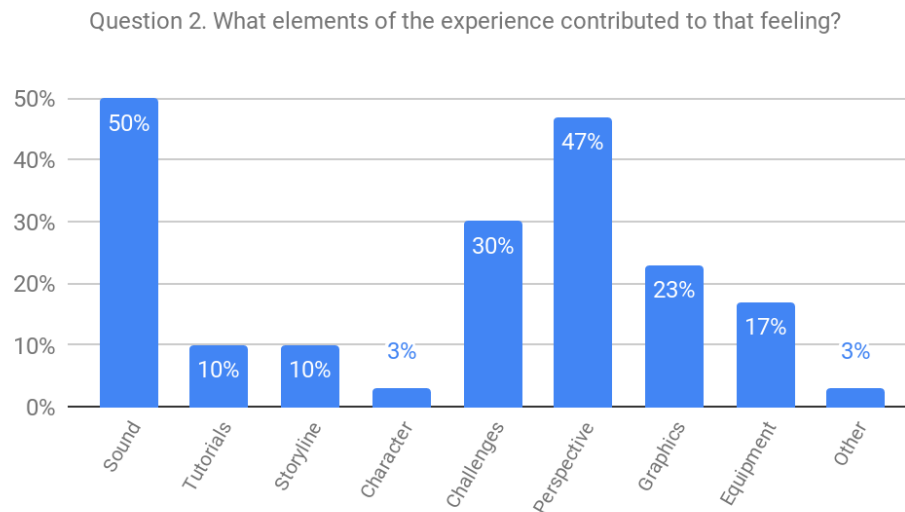


Figure 5. Data shows the feelings of tension, alertness, and anxiety during player gameplay are an effect of the game’s sound and perspective.

In response to the first interview question that asked what elements of the experience contributed to the majority of their feelings during gameplay, 46% of participants reported that perspective was the main contributor to feeling alert, anxious, and/or tense. One non-VR participant said, “I really like that the game is in first-person perspective because it almost feels like I am doing the stuff my character is doing” [P1]. Although many of the non-VR participants said they would much rather play in VR, they also noted that the game effectively utilized perspective and camera angles. The majority of VR participants said that using virtual reality intensified the first-person perspective by narrowing the player’s focus and isolating light outside the headset. One VR participant said, “ You know how a race horse has side blinders, I think that’s what this headset it like. There aren’t distractions from the game, which makes it more intense” [P2].

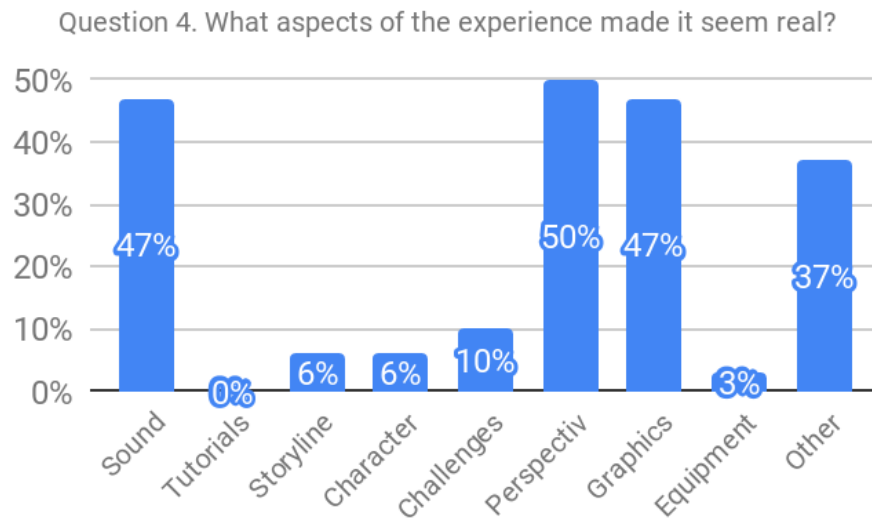


Figure 6. Data shows that participants found perspective, graphics, and sound were the elements that made their gameplay experience seem real.

Thirty percent of participants reported that the game's challenges or main objectives were the leading cause of their general feelings throughout the game. One participant noted a specific instance that stood out as an example, saying, "I felt this fight or flight reaction throughout most of the game but especially when I encountered Marta" [P5]. When asked what aspects of the experience could be improved to be more immersive, 20% of participants suggested that the game's challenges and objectives needed the most improvement.

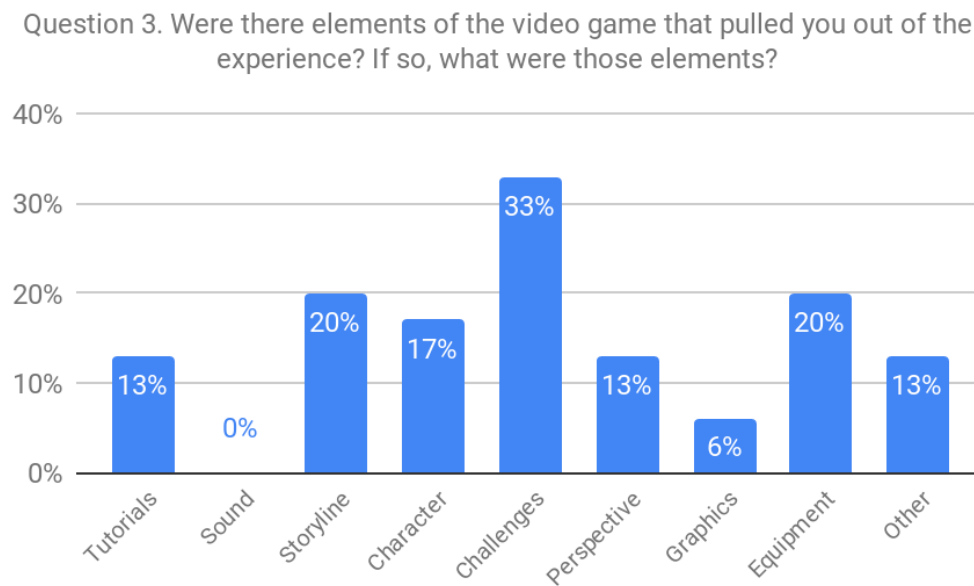


Figure 7. Data represents the highest levels of responses to Question 3 of the interview are the game's challenges.

Both the storyline and tutorials caused confusion and a desire for improvement for between 20 and 30% participants. One participant said, "It looks cool but I don't understand what I'm really supposed to do and how I'm supposed to do it, so I wasn't able to figure out how to progress in the game" [P8]. The majority of responses to Question 5 revealed that the perspective displayed throughout gameplay was in need of the most improvement to promote more immersion. 40% of participants claimed that virtual reality enhancement would benefit the experience. Of this 40%, all participants were of the condition group that did not use virtual reality enhancement during their gameplay session.

Question 5. What aspects of the experience could be improved so that it feels more immersive?

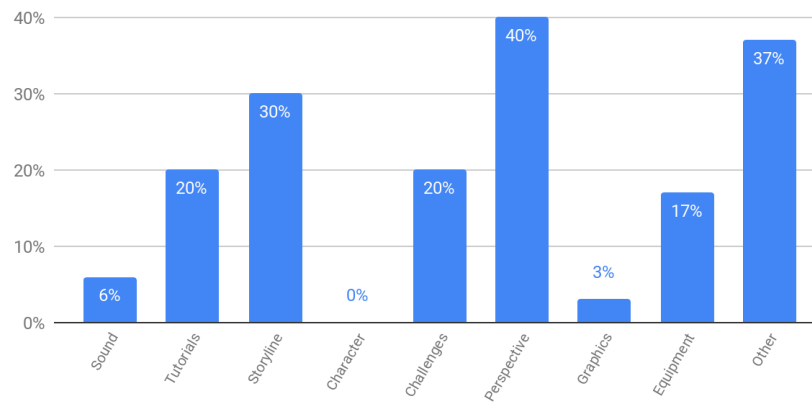


Figure 2.5. Data shows the results for perspective, storyline, challenges, and tutorials as being the components in most need for improvement to promote the highest levels of player immersion.

CHAPTER 5: DISCUSSION

This final chapter presents recommendations and best practices to design, develop, and experience SHVGs in order to better facilitate immersion during gameplay. Both quantitative and qualitative data were gathered from 30 participants prior to and after playing *Outlast 2*. The discussion is based on the aforementioned definition of immersion, which is the process of becoming psychologically present within a virtual world (Wirth et al., 2007). Several key requirements and limitations are presented based on the quantitative and qualitative data gathered throughout this study. These requirements are categorized into two general game design topics: narrative manipulation and sensory perception manipulation. Narrative manipulation concentrates on the storytelling elements of game design, whereas sensory perception manipulation concentrates on the sound, perspective, and graphic game design elements.

Recommendations for Survival Horror Video Game Design

Based on the findings of this study, the following recommendations will provide future research and game development with both data and concepts to form a framework that implements elements of narrative and sensory perception manipulation. This framework would then promote the highest levels of player immersion while remaining a survival horror video game. The following recommendations act to improve player immersion for future SHVGs.

Requirement #1: To effectively engage player immersion, narrative manipulation must employ a rich plot, player agency, and natural interactions between both the player and game as well as the characters within the game. Data suggests that player agency was the most effective way to immerse players in respect to narrative manipulation. This means that survival horror video game design must design a narrative storyline that provides players with choices to further the plot. In addition, specific recommendations are:

- Limit the use of cutscenes
- Limit the use of triggered character dialogue
- Implement multiple ways to meet game objectives
- Design player choices that affect storyline

Requirement #2: To effectively engage player immersion, sensory perception manipulation must employ first-person perspective and directional sound. Data suggests that first-person perspective promotes the embodiment of the character, which in turn promotes immersion. Both sound and perspective were the two elements of game design that participants felt promoted or enhanced immersion during gameplay. Virtual reality enhancement showed higher immersion in both qualitative and quantitative data. This is because the PSVR headset restricted sound and sight within the gaming environment. In addition, specific recommendations are:

- Implement directional sound
- Design graphic display settings for a brighter gaming environment
- Develop 360-degree perspective for virtual reality enhancement

Narrative Manipulation

Narrative is a device used to immerse a gamer with an enriching plot that requires them to conquer obstacles in order to experience a satisfying resolution. Narrative manipulation relies on storytelling tactics to metaphorically bring the virtual world to life and immerse the player. *Outlast 2* employs tactics that encompass the basic characteristics of the survival horror genre including cutscenes, linear structure, and character development.

As mentioned in the literature review, research has argued that cutscenes often break immersion between the gaming environment and the game player (Rouse, 2009). Results from

the semi-structured interview align with this argument. These results emphasize the need for game designers to incorporate new strategies for plot enrichment. One participant said, “I felt like I was in the game for the majority of the time but the first few minutes of cutscenes made me remember this was just a game. Even though I know it helps build out the story, I think it could be portrayed differently” [P6]. In addition, this response recognizes that storyline is an important aspect of gameplay. During the interview, the majority of participants noted that storyline is often the main reason to play video games. Six percent of participants noted that the storyline was the most immersive element of the game, whereas thirty percent of participants felt the storyline of *Outlast 2* needed to improve for a more immersive experience. One participant said, “I felt like I was in the game for the majority of the time but the first few minutes of cutscenes made me remember this was just a game. Even though I know it helps build out the story, I think it could be portrayed differently” [P6].

This study also found that character development enhances player experience and contributes to character embodiment. Although storyline often enhances gameplay, participants noted in their interviews the importance of character development. One player said, “When I’m playing any game, it’s important that I can resonate with my character. It’s even more important when the game is using first-person because I pretty become that character if that makes sense” [P8]. The interviews also found that many participants did not resonate with the main character of *Outlast 2*. One reason was due to the character’s dialogue throughout gameplay. More than one instance was observed that suggested dissatisfaction concerning the character’s dialogue while participants played *Outlast 2*. These instances included participants vocalizing their dissatisfaction with the character’s dialogue. Often these instances were in response to a phrase said by the character. For example, one scene particularly initiated character dialogue when he

arrives into an abandoned town. Upon arrival, the character states, “A town. Oh thank God, I thought we were miles from anything” (Red Barrels, 2017). In response, one participant replied, “Oh, you are so observant. God, this dude is dumb” [P4]. This response is one example that emphasizes the disconnect between the participant and character, which has the potential to break immersion.

Such restrictive narratives result in less options for players to manipulate gameplay. This study showed a similar argument. The storyline of *Outlast 2* was so limiting that it provided no choices for players. There was only one way to progress throughout the game, and this lack of player agency negatively impacted players’ levels of immersion. Of the interview results, a majority of participants suggested the option of more choices would be more engaging. Input from the interview suggests that this lack of choice occurred for the majority of gameplay. The initial cutscene to introduce *Outlast 2* was the most noticeable restriction of player agency. One participant noted in her interview, “the storyline didn’t resonate with me mostly because I felt like I had no way to really affect it. That’s why I prefer Skyrim or role playing games” [P23]. Like most SHVGs, *Outlast 2* is designed as a linear structure, meaning the player has one specific path to follow with no choices. As mentioned in the literature review, most video game researchers argue that storytelling with a linear-structure often restricts or limits player agency. This player agency provides players the choices to unfold, progress, or change the narrative. When a player is given less agency, they are likely to withdraw from the experience, which also affects their levels of immersion.

Sensory Manipulation

Sensory manipulation encompasses the sensations humans use to recognize and respond to their environments. This includes the five senses: sight, smell, touch, taste, and sound. Of

these senses, video game design has introduced interactive virtual worlds that provide opportunities to engage with sight, touch, and sound. This research focuses on how *Outlast 2* and VR has implemented sensations to induce player immersion.

Lighting has a negative effect on perspective and overall immersion. This means that the player's experience relies heavily on the gaming environment. Too much screen light is capable of interfering with game display, which causes confusion, irritation, and eye strain. This issue was particularly present in the group of participants not using virtual reality enhancement. Seven participants of this group stopped playing the game to adjust the lighting by moving the television screen or increasing the brightness levels in the game menu settings. Overall, this issue of brightness caused this set of participants to withdraw from the game, which effects how immersed within the virtual world they become. In contrast, the virtual reality headset effectively shielded the participants' eyes from environmental lighting. One VR participant said, "You know how a race horse has side blinders, I think that's what this headset it like. There aren't distractions from the game, which makes it more intense" [P2]. The semi-structured interview results showed that perspective was a main factor that contributed to how players felt during gameplay. By using first-person perspective, players were able to assume the character's body as their own and faced less distractions in the virtual world.

VR headsets not only block light but also narrow players' focal point by limiting their peripheral vision. In turn, players are more focused on the game because they are unable to see outside distractions. By isolating perspective, players are likely to experience more immersion. As previously stated, first-person perspective was recognized by the majority of players as being critical to their immersion because of its ability to reduce distractions while players embody their character. One non-VR participant said, "I really like that the game is in first-person

perspective because it almost feels like I am doing the stuff my character is doing” [P1]. When looking at the statistical significance between players’ immersive tendencies before and during gameplay, data showed that focus was higher during gameplay than daily activities. There were also statistically significant differences between VR and non-VR players on the dimension of focus. This data promotes the concept that virtual reality heightens the player’s perspective, which in turn promotes higher levels of focus and overall immersion. This data also suggests that virtual reality headsets physically block out the environment around the player like blocking out light.

Overall, sound was the leading factor of immersion for both condition groups. The majority of non-VR players said their responses depended mainly on sounds within the game. Players using the virtual reality headset found that sounds were more directional and clearer than past experiences playing without VR. Data shows that 47% of participants said sound was responsible for making their experience seem real. Both condition groups showed similar responses to sound’s effect on their gameplay experience. One virtual reality participant said, “VR is a novelty item that seems too gimmicky at this stage. I honestly think a good set of headphones create the same level of immersion” [P4]. This suggests that sound is the most immersive element of *Outlast 2* because it provides perspective through directional audio while also intensifying noises. Therefore, sound components do not rely on VR enhancement to provide perspective or immersion.

Limitations

There were two considerable limitations in this study: sample size and the user-tested video game. Due to the small sample size and the use of only one video game studied, the results of this data cannot be generalizable. These limitations may account for the statistically

insignificant data of the qualitative study results. The small sample size is the outcome of time restrictions brought on by the research session being one hour or less as well as the scheduling conflicts of the Ball State student participants. Time restriction particularly affected the use of the one video game that was presented in testing. *Outlast 2* was chosen for user testing because it required little to no experience or prior understanding of the series but encompassed the basic characteristics of the survival horror genre. This game also has a relatively short cut-scene that introduces each player to the storyline. Therefore, participants had a better chance of understanding the storyline without using too much of the 30-minute timeframe for gameplay.

Implications for Future Research

With such rich narratives and evolving technology, it can be expected that survival horror video games will continue to populate the market. This popularity will promote a greater need for future research to understand and generate SHVGs that provide an immersive and enjoyable experience for players. Much of this study's data was collected by a small demographic. The majority of participants (22 out of 30 total) were male, while the remaining eight participants were female. In addition, the age range for the majority of participants was between 18-24 years old. To improve upon this research, a larger sample size pulled from outside a university setting has the potential to better represent the population's experience with SHVGs.

This study was focused on one video game (*Outlast 2*) to represent all SHVGs of the genre. While *Outlast 2* encompasses most survival horror design techniques, there are dozens of existing SHVGs that provide different elements, arguments, and strategies for future research of the survival horror genre. An assessment that determines the strengths and weaknesses of additional SHVGs would grant more conclusive data to impact SHVG design. Additionally, this study used the PlayStation 4 console as well as its PSVR attachment. Expanding research to the

assessment of other consoles and virtual reality enhancement equipment has the potential to gain better data. Lastly, the majority of data was compiled using participants' self-assessment. Therefore, these methods do not guarantee validity and/or reliability. To strengthen the accuracy and validity of future research, it is necessary that a more standardized method be built and used to determine or assess player immersion. Based on the recommendations provided, future research would allow for a validation of these findings to build a framework for survival horror video game designers that would promote the highest levels of player immersion during gameplay.

Conclusion

Survival horror video games are one of the fastest growing genres being developed while their overall structure remains restrictive to its player. This restriction, while perhaps being one element that makes it unique to its genre, is causing a break in immersion for many players. This research analyzes what components of narrative and sensory perception contribute to or break player immersion. Data from this research shows that virtual reality enhancement provides more intimacy between the game and player where narrative fell short. The majority of data suggests that restricting perspective with VR and implementing a less restrictive narrative has the potential to create optimal player immersion in SHVGs.

REFERENCES

- Abbasi, A. Z., & Jamak, Abu Baker Sedek Abdul. (2017). Playful-consumption experience of videogame-play influences consumer video-game engagement: A conceptual model. *Global Business and Management Research: An International Journal*, 9 SI(1), 244.
- Allanson, J., Gilleade, K. M., & Dix, A. (2005). Affective Videogames and Modes of Affective Gaming: Assist Me, Challenge Me, Emote Me. *Proceedings of the 2005 Digra International Conference: Changing Views: Worlds in Play*. Retrieved from <http://www.digra.org/wp-content/uploads/digital-library/06278.55257.pdf>
- Aylett, R., Louchart, S., & Weallans, A. (2011, November). Research in interactive drama environments, role-play and story-telling. In *International Conference on Interactive Digital Storytelling* (pp. 1-12). Springer, Berlin, Heidelberg.
- Bantinaki, K. (2012). The Paradox of Horror: Fear as a Positive Emotion. *The Journal of Aesthetics and Art Criticism*, 70(4), 383-392. Retrieved from <http://www.jstor.org.proxy.bsu.edu/stable/43496533>
- Brockmyer, J. H., Fox, C. M., Curtiss, K. A., McBroom, E., Burkhart, K. M., & Pidruzny, J. N. (2009). The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing. *Journal of Experimental Social Psychology*, 45(4), 624-634.
- Brown, E., & Cairns, P. (2004, April). A grounded investigation of game immersion. In *CHI'04 extended abstracts on Human factors in computing systems* (pp. 1297-1300). ACM.
- Calvert, S. L., & Tan, S. L. (1994). Impact of virtual reality on young adults' physiological arousal and aggressive thoughts: Interaction versus observation. *Journal of applied developmental psychology*, 15(1), 125-139.
- Capcom. (1996). *Resident Evil* [PlayStation]. Osaka, Japan: Capcom.
- Christy, K. R., & Fox, J. (2016). Transportability and presence as predictors of avatar identification within narrative video games. *Cyberpsychology, Behavior, and Social Networking*, 19(4), 283-287. 10.1089/cyber.2015.0474
- Domsch, S. (2013). *Storyplaying: Agency and narrative in video games* (Vol. 4). Walter de Gruyter.
- Dovey, J., & Kennedy, H. W. (2006). *Game cultures: Computer games as new media: computer games as new media*. McGraw-Hill Education (UK).
- Ermi, L., & Mäyrä, F. (2005). Fundamental components of the gameplay experience: Analysing immersion. *Worlds in play: International perspectives on digital games research*, 37(2), 37-53.
- Frasca, G. (2001). Rethinking agency and immersion: video games as a means of consciousness-raising. *Digital Creativity*, 12(3), 167-174.
- Gilbert, B. (2017, June 05). The PlayStation 4 is selling about twice as fast as the Xbox One. Retrieved February 24, 2019, from <https://www.businessinsider.com/playstation-4-ps4-xbox-one-sales-2017-6>
- Girard, P. (2011). "The Fear System"-Triggering Tension in Survival Horror Videogames. Retrieved from <http://www.grin.com/de/e-book/177512/the-fear-system-triggering-tension-in-survival-horror-videogames>
- Hillier, B. (2014, June 12). What's the difference between "horror" and "survival horror"? Let Shinji Mikami explain. Retrieved February 25, 2019, from https://www.vg247.com/2014/06/12/the-evil-within-shinji_mikami-survival-horror/
- IJsselsteijn, W., Poels, K., & de Kort, Y. A. W. (2008). The Game Experience Questionnaire: Development of a self-report measure to assess player experiences of digital games. Eindhoven: TU Eindhoven. FUGA Deliverable D3.3. Technical Report.

- Kirkland, E. (2009). Storytelling in survival horror video games. *Horror video games: Essays on the fusion of fear and play*, 62-78.
- Kromand, D. (2008). Sound and the diegesis in survival-horror games. *Audio Mostly 2008*.
- Maxis. (2000). *The Sims* [Computer]. Redwood City, California, US: Electronic Arts.
- Nacke, L. E. (2010, May). Wiimote vs. controller: electroencephalographic measurement of affective gameplay interaction. In *Proceedings of the international academic conference on the future of game design and technology* (pp. 159-166). ACM.
- Majewski, J. (2003). Theorising video game narrative. *Bond University*.
- McMahan, A. (2003). Immersion, engagement and presence. *The video game theory reader*, 67, 86.
- Monforton, H. E. (2016). "There Are No Observers Here": The Video Game Gaze in Outlast (2013). *Examining the Evolution of Gaming and Its Impact on Social, Cultural, and Political Perspectives*, 54-69. Retrieved from <https://books.google.com/books?hl=en&lr=&id=nt15DAAAQBAJ&oi>
- Nacke, L. E., & Lindley, C. A. (2010). Affective ludology, flow and immersion in a first-person shooter: Measurement of player experience. *arXiv preprint arXiv:1004.0248*.
- Novitz, J. (2017). Scarcity and Survival Horror. *Transactions*, 3(1), 63-88. Retrieved from <https://researchbank.swinburne.edu.au/items/2c335c0c-fe18-4302-86de-671ffe71698b/1/>
- Nogueira, P. A., Vasco T., Rodrigues R., Oliveira E., & Nacke L. E. 17 December 2015. Vanishing scares: biofeedback modulation of affective player experiences in a procedural horror game. *J Multimodal User Interfaces*, vol. 10, page 31-62. Retrieved from <https://link-springer-com.proxy.bsu.edu/content/pdf/10.1007%2Fs12193-015-0208-1.pdf>
- Parsec Productions. (2012). *Slender: The Eight Pages* [Computer]. New Mexico: Parsec Productions.
- Perron, B. (2006). The heuristic circle of gameplay: the case of survival horror. *Gaming realities: A challenge for digital culture*, 62-71. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.93.3075&rep=rep1&type=pdf>
- Perron, B. (2009). The Survival Horror: The Extended Body Genre. *Horror Video Games: Essays on the fusion of fear and play*, 121-144.
- Perron, B. (2012). *Silent Hill: The Terror Engine*. University of Michigan Press. Retrieved from <https://books.google.com/books?hl=en&lr=&id=vc9lzxNJpccC&oi>
- Pinchbeck, D. (2009). Shock, Horror: First-Person Gaming, Horror, and the Art of Ludic Manipulation. *Horror Video Games: Essays on the fusion of fear and play*, 79-94.
- Red Barrels. (2017). *Outlast 2* [PlayStation 4]. Quebec, Canada: Red Barrels.
- Rouse, R. (2009). Match Made in Hell: The Inevitable Success of the Horror Genre in Video Games. *Horror Video Games: Essays on the fusion of fear and play*, 15-25.
- Tamborini, R., & Skalski, P. (2006). The role of presence in the experience of electronic games. *Playing video games: Motives, responses, and consequences*, 225-240.
- Tinwell, A., Grimshaw, M., & Williams, A. (2010). Uncanny behaviour in survival horror games. *Journal of Gaming & Virtual Worlds*, 2(1), 3-25.
- Vachiratamporn, V., Moriyama, K., Fukui, K. I., & Numao, M. (2014, August). An implementation of affective adaptation in survival horror games. In *Computational Intelligence and Games (CIG), 2014 IEEE Conference on* (pp. 1-8). IEEE.
- Wirth, W., Hartmann, T., Böcking, S., Vorderer, P., Klimmt, C., Schramm, H., ... & Biocca, F. (2007). A process model of the formation of spatial presence experiences. *Media psychology*, 9(3), 493-525.
- Witmer, B. G., & Singer, M. J. (1994). *Measuring immersion in virtual environments*. Tech. Rep. 1014, US Army Research Institute for the Behavioral and Social Sciences.

Zarzycki, A. (2016). Epic video games: Narrative spaces and engaged lives. *International Journal of Architectural Computing*, 14(3), 201-211.

APPENDICES

Appendix A: Background Demographics Questionnaire

Fill out the questionnaire below with the information that best represents you.

1. Gender
2. Age
3. Hours of video games played per week
4. Preferred genre of video game to play

Appendix B: Immersive Tendency Questionnaire

Immersive Tendency Questionnaire

(Witmer & Singer, 1994)

On the 7-point scale, rate your experience by marking an "X" in the appropriate box that best represents your answer for each question. Consider the entire scale when responding. In the order listed, answer each question. Do not skip questions.

1. Do you easily become deeply involved in movies or tv dramas?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

2. Do you ever become so involved in a television program or book that people have problems getting your attention?

1	2	3	4	5	6	7
NEVER			OCCASIONALLY		OFTEN	

3. How mentally alert do you feel at the present time?

1	2	3	4	5	6	7
NOT ALERT		MODERATELY		FULLY ALERT		

4. Do you ever become so involved in a movie that you are not aware of things happening around you?

1	2	3	4	5	6	7
NEVER			OCCASIONALLY		OFTEN	

5. How frequently do you find yourself closely identifying with the characters in a story line?

1	2	3	4	5	6	7
NEVER			OCCASIONALLY		OFTEN	

6. Do you ever become so involved in a video game that it is as if you are inside the game rather than moving a joystick and watching the screen?

1	2	3	4	5	6	7
NEVER			OCCASIONALLY		OFTEN	

7. How physically fit do you feel today?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NOT FIT

MODERATELY FIT

EXTREMELY FIT

8. How good are you at blocking out external distractions when you are involved in something?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NOT GOOD

SOMEWHAT GOOD

VERY GOOD

9. When watching sports, do you ever become so involved in the game that you react as if you were one of the players?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

10. Do you ever become so involved in a daydream that you are not aware of things happening around you?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

11. Do you ever have dreams that are so real that you feel disoriented when you awake?

1	2	3	4	5	6	7
NEVER		OCCASIONALLY			OFTEN	

12. When playing sports, do you become so involved in the game that you lose track of time?

1	2	3	4	5	6	7
NEVER		OCCASIONALLY			OFTEN	

13. How well do you concentrate on enjoyable activities?

1	2	3	4	5	6	7
NOT WELL		MODERATELY WELL			VERY WELL	

14. How often do you play arcade or video games? (OFTEN should be taken to mean every day or every two days, on average.)

1	2	3	4	5	6	7
NEVER		OCCASIONALLY			OFTEN	

15. Have you ever gotten excited during a chase or fight scene on TV or in the movies?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

16. Have you ever gotten scared by something happening on a TV show or in a movie?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

17. Have you ever remained apprehensive or fearful long after watching a scary movie?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

18. Do you ever become so involved in doing something that you lose all track of time?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

Appendix B: Post- Immersive Tendency Questionnaire

Immersive Tendency Questionnaire

(Witmer & Singer, 1994)

On the 7-point scale, rate your experience by marking an "X" in the appropriate box that best represents your answer for each question. Consider the entire scale when responding. In the order listed, answer each question. Do not skip questions.

1. Did you easily become deeply involved in the survival horror video game?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

2. Did you become so involved in the survival horror video game that people would have had problems getting your attention?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

3. How mentally alert do you feel at the present time?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NOT ALERT

MODERATELY

FULLY ALERT

4. Did you become so involved in the survival horror video game that you were not aware of things happening around you?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

5. How frequently did you find yourself closely identifying with the characters in a story line?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

6. Did you ever become so involved in the survival horror video game that it was as if you were inside the game rather than moving a joystick and watching the screen?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

7. How physically fit do you feel now?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NOT FIT

MODERATELY FIT

EXTREMELY FIT

8. How good were you at blocking out external distractions when you were playing the survival horror video game?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NOT GOOD

SOMEWHAT GOOD

VERY GOOD

9. When playing the survival horror video game, did you ever become so involved in the game that you reacted as if you were your game character?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

10. Do you ever become so involved in a daydream that you are not aware of things happening around you?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

11. Do you ever have dreams that are so real that you feel disoriented when you awake?

	1		2		3		4		5		6		7	
NEVER			OCCASIONALLY					OFTEN						

12. When playing sports, do you become so involved in the game that you lose track of time?

	1		2		3		4		5		6		7	
NEVER			OCCASIONALLY					OFTEN						

13. How well did you concentrate while playing the survival horror video game in comparison to other activities you enjoy?

	1		2		3		4		5		6		7	
NOT WELL			MODERATELY WELL					VERY WELL						

14. How often would you consider playing this survival horror video game? (OFTEN should be taken to mean every day or every two days, on average.)

	1		2		3		4		5		6		7	
NEVER			OCCASIONALLY					OFTEN						

15. Did you get excited during a chase or fight scene in the survival horror video game?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

16. How often did you feel scared by something happening in the survival horror video game?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

17. Did you remain apprehensive or fearful long after encountering a challenge or obstacle in the survival horror game?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

18. Did you become so involved in doing something in the survival horror video game that you lost all track of time?

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NEVER

OCCASIONALLY

OFTEN

Appendix D: Interview

1. Describe how you felt for the majority of the experience.
2. What elements of the experience contributed to that feeling?
3. Were there elements of the video game that pulled you out of the experience? If so, what were those elements?
4. What aspects of the experience made it seem real?
5. What aspects of the experience could be improved so that it feels more immersive?